

MANUFACTURING EXTENSION PARTNERSHIP

Success Stories from the Field

Westinghouse Electric Company

Connecticut State Technology Extension Program

Total Productive Maintenance Improves Equipment Output At Westinghouse Electric Company

Client Profile:

Westinghouse Electric Company, LLC, part of the Nuclear Utilities Business Group of British Nuclear Fuels Limited (BNFL), is a leading supplier of products and services to the nuclear power industry. The company maintains seven sites across the U.S. and Europe that comprise Westinghouse Nuclear Fuel. Westinghouse Nuclear Fuel is the largest supplier of nuclear fuel in the U.S.

Westinghouse Electric Company's Windsor, Connecticut facility, which employs 160 people, produces components for nuclear fuel assemblies that power nuclear reactors by applying advanced automated laser welding systems, CNC machine tools, and vision-based coordinate measuring machines. Most of its output is shipped to Westinghouse's Nuclear Fuel Fabrication Facility in Columbia, South Carolina, where it is assembled into nuclear fuel assemblies. Other components are shipped to another Westinghouse Nuclear Fuel Fabrication Facility in Sweden, or directly to electric utility customers. The Windsor plant produces approximately \$20 million worth of nuclear fuel components a year.

Situation:

Westinghouse Electric Company (WEC) discovered that, with the onset of deregulation in the electric power industry and consolidations within that industry, the price of a nuclear fuel assembly has become a driving market force. The company needed to reduce costs to stay competitive, and began searching for ways to improve its equipment effectiveness.

While attending a "best practice day" at Kaman Aerospace, WEC's continuous improvement leader heard about total productive maintenance (TPM), a lean methodology for eliminating equipment stoppage, from John Kravontka, Managing Member of TPM Unlimited, LLC. Mr. Kravontka led a successful TPM project at Kaman Aerospace, and had also been conducting TPM projects as a service provider for the Connecticut State Technology Extension Program (CONNSTEP), a NIST MEP network affiliate, through the PRIME program. PRIME is part of Northeast Utility (NU)'s Commercial and Industrial Conservation Load Management initiative, an outgrowth of the state of Connecticut's electric utility restructuring legislation. Its objective is to help small to medium-sized manufacturing customers save energy by improving the effectiveness of their production processes, using CONNSTEP's lean manufacturing specialists. Mr. Kravontka's TPM protocol has been incorporated in a formal training module used

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by CONNSTEP and 70 other Manufacturing Extension Partnerships nationwide.

Solution:

WEC invited Mr. Kravontka to give the Windsor site's plant manager and his staff a TPM overview. After seeing what he could accomplish, they asked him to help implement TPM on-site. Mr. Kravontka suggested PRIME and CONNSTEP be involved.

From March to September 2002, WEC's overall equipment effectiveness (OEE) averaged 45 percent, meaning 55 percent of the time the equipment produced substandard products. CONNSTEP and PRIME arranged a NU-sponsored five-day focused improvement event, led by Mr. Kravontka. It addressed the elimination of the two major causes of 80 percent of the equipment breakdowns, and developed low cost methods to clean the air in the facility. The project focused on locating and eliminating six major equipment-related losses, and established profitable methods to inspect and clean the equipment. Mr. Kravontka taught WEC simple predictive maintenance concepts that greatly reduce energy consumption. The event also created an environment to energize employees in TPM, and taught them the 5S (Sort, Set-In-Order, Shine, Standardize, and Sustain) workplace organization principle.

Mr. Kravontka initially trained two teams (welding and high-speed CNC lathe), and later provided an overview of TPM to all salaried and hourly manufacturing personnel. The two teams received enough guidance that they could discover the reasons behind substandard equipment performance and be able to identify countermeasures to improve its performance.

Following the event, WEC teams applied their training on the shop floor and made significant improvements to the operational efficiency of the equipment. As a result, the company is realizing significant savings in overtime and rework.

Results:

Improved the accuracy and reliability of the laser welding head.

Eliminated contamination in the weld area by increasing the suction that removes welding debris.

Increased CNC lathe lubrication to drastically reduce contamination and noise.

Increased OEE for the laser-welding machine to 72 percent.

Increased laser capacity by 60 percent.

Reduced rework and overtime costs by \$65,000 per year.

Saving over 23,000 kilowatt hours.

Testimonial:

"The program [that PRIME, CONNSTEP, and Total Productive Maintenance Unlimited] conducted significantly improved the availability and quality output of our laser welding equipment. These results enabled us to achieve our goals of reducing scrap and rework costs and improving our on-time delivery."

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Cary Alstadt, Plant Manager